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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/903,119	07/10/2001	Bradley Dale Mitchell	12522:12	9544

7590 02/27/2003  
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EXAMINER

WIGGINS, JOHN DAVID

ART UNIT PAPER NUMBER

2856

DATE MAILED: 02/27/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/903,119

Applicant(s)

Bradley Dale Mitchell

Examiner

David J. Wiggins

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on July 10, 2001 [Application for US PTO patent]
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-50 is/are pending in the application.
- 4a) Of the above, claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8, 11-13, 15-22, 25-27, 29-34, 37-39, 41-44, and 47-49 is/are rejected.
- 7) ☒ Claim(s) 9, 10, 14, 23, 24, 28, 35, 36, 40, 45, 46, and 50 is/are objected to.
- 8) ☐ Claims \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on Jul 10, 2001 is/are a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some\* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\*See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☒ Interview Summary (PTO-413) Paper No(s). 06
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s). 05 6) ☐ Other:

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**Part III DETAILED ACTION**

**Examiner's Office Action**

***Drawings***

1. *This application has been filed with formal drawings acceptable for examination purposes only, which drawings have been judged acceptable on their technical merit by the Examiner, although being judged to display NON-acceptable quality standards in any Patent Drawing Review to be done by a US PTO draftsman after the 07/10/2001 filing date [the rulings, line definition, legible print calligraphy, and lack of parallel line symmetry between mutually pairs of lines are not deemed professional.*

***Specification***

2. The disclosure is objected to because of the following informalities:

On Page 13, line 26 of original specification dated 07/10/2001; please consider replacing the mis-spelled word "mat" in the

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phrase "which mat tie" with the following intended form:

--- may ---

On Page 07, line 11 of original specification dated 07/10/2001;  
before the word "chamber" please consider inserting the following  
term:

--- reaction ---

On Page 18, claim 1, line 01 of original specification dated  
07/10/2001; before the word "system", please consider inserting  
the following phrase:

--- quality control ---

OR --- damage prevention ---

OR --- fault reduction ---

OR --- quality assurance ---

OR --- deposit-reducing ---

On Page 18, claim 1, line 02 of original specification dated  
07/10/2001; before the word "chamber", please consider inserting  
the following term:

--- fabrication ---

On Page 18, claim 1, line 04 of original specification dated  
07/10/2001; after the words "gaseous flow path", please consider  
inserting the following phrase:

--- for supplying gases used in processing  
and manufacturing said integrated circuit structures ---

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On Page 18, claim 1, line 09 of original specification dated 07/10/2001; after the word "blockage", please consider inserting the following phrase: --- or an occlusion ---

On Page 19, claim 15, line 01 of original specification dated 07/10/2001; before the word "system", please consider inserting the following phrase: --- quality control ---

On Page 19, claim 15, line 03 of original specification dated 07/10/2001; before the word "chamber", please consider inserting the following term: --- fabrication ---

On Page 20, claim 15, line 02 of original specification dated 07/10/2001; after the words "gaseous flow path", please consider inserting the following phrase:

--- for supplying gases used in processing and manufacturing said integrated circuit structures ---

On Page 21, claim 29, line 01 of original specification dated 07/10/2001; before the word "method", please consider inserting the following phrase: --- quality control ---

On Page 21, claim 29, line 03 of original specification dated 07/10/2001; before the word "chamber", please consider inserting the following term: --- fabrication ---

On Page 21, claim 29, line 03 of original specification dated 07/10/2001; after the words "semiconductor wafers", please

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consider inserting the following phrase: --- and a gaseous flow  
path for supplying gases used in processing and  
manufacturing said integrated circuit structures ---

On Page 21, claim 29, line 07 of original specification dated  
07/10/2001; after the words "gaseous flow path", please consider  
inserting the following phrase:

--- caused by said residue buildup ---

On Page 23, claim 41, line 01 of original specification dated  
07/10/2001; before the word "system", please consider inserting  
the following phrase:

--- quality control ---

On Page 23, claim 41, line 02 of original specification dated  
07/10/2001; before the word "chamber", please consider inserting  
the following term:

--- fabrication ---

On Page 23, claim 41, line 04 of original specification dated  
07/10/2001; after the words "gaseous flow path", please consider  
inserting the following phrase:

--- for supplying gases used in processing

and manufacturing said integrated circuit structures ---

On Page 23, claim 41, line 14 of original specification dated  
07/10/2001; after the words "baseline flow of gas", please  
consider inserting the following phrase:--- in order to determine  
any possible occurrence of a blockage in said system ---

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Appropriate correction is requested or required.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. § 103 which forms the basis for all obviousness rejections set forth in this Office action:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Subject matter developed by another person, which qualifies as prior art only under subsection (f) or (g) of section 102 of this title, shall not preclude patentability under this section where the subject matter and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person.

4. Claims 1-8, 11-13, 15-22, 25-27, 29-34, 37-39, 41-44 and 47-49 are rejected under 35 U.S.C. § 103 as being unpatentable over Chen, A. et al., in view of [Lewis, G. et al. and Zabala, R. et al.], in view of Yamakawa, T. et al..

The prior art of Chen et al. teaches using a reaction chamber, flow controller, flow detector and gas flow system in a semiconductor wafer integrated circuit structure producing apparatus that covers most features of the instant invention

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except for (1) having a flow comparator for detecting occurrence of blockages or occlusions in a flow path channel by noting changes in gas flow rate apart from the baseline gas flow rate; and except for (2) having a heating element type of flow detector with a temperature measurement device and power supply power consumed measurement device, all used in a combination to determine gas flow rate. However, the prior art of Lewis et al. discloses the concept of detecting obstructions [blockages, bubbles or occlusions] in a fluid flow line by monitoring for the occurrence of pressure changes, where of course any pressure change is inherently accompanied by an associated flow rate change in accordance with known laws of fluid mechanics; e.g.- Bernoulli's formula. Also & similarly, the prior art of Zabala et al. discloses such a partial blockage event as it develops in a fluid passageway via a flow monitoring method- please see their Column 3, line 7 - Column 5, line 35 along with claims 24 & 30 & part 42 in Figure 1 for relevant details of a flowmeter approach that is quite compatible/adaptable toward the pressure monitoring system of Lewis et al.; Likewise, please refer to Lewis et al. at their Column 1, line 55 - Column 3, line 45 together with Figure 1 thereof for pertinent details. It would have been obvious to one of ordinary skill in the art to consider identifying a

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blockage/occlusion condition in a flowline by such a flow rate change occurrence because the change in pressure is concomitant, coexisting and physically related to the change in flow rate via known Physics equations. Also, the prior art of Yamakawa et al. teaches the technique of measuring flow rate in a passageway on the basis of heat transfer phenomena that take place between heaters and the moving fluid by determining the differences in electrical power supplied to the heaters; i.e.- since power is equal to  $I^2 \times R$  in the classic relation that involves current  $I$  and resistance  $R$ ; the Applicant is advised to review Yamakawa et al. at their Column 1, line 22 - Column 6, line 22 along with Figures 1A, 1B & 5 for relevant details. It would have been obvious to one of ordinary skill in the art to consider measuring a flow rate change in this manner since the difference in Joule Heating  $I^2 \times R$  produced in the electrical heaters is known to transfer into the moving fluid {by conduction & convection} and a change in fluid flow status will produce a corresponding thermal flux change [thus resulting in a observable/ detectable temperature change between two sensor point locations in the fluid, flowpath- when any partial flow obstruction or blockage occurs in same flowpath].

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***Allowable Subject Matter***

5. Claims 9-10, 14, 23-24, 28, 35-36, 40, 45-46 and 50 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

6. The following is an Examiner's statement for the indication of reasons for allowable subject matter in this instant application: The prior art fails to disclose a quality control method and/or system for detecting blockage, residue build-up and/or occlusions in a semiconductor wafer integrated circuit structure manufacturing/processing apparatus that comprises a *fabrication chamber for placing such semiconductor wafers and a gaseous flow path for supplying gases used in manufacturing and processing such integrated circuit structures*; where such method system determines a volume of gas flowing from a gas source & supply thru the apparatus, and *compares the flow of such gas to a baseline gas flow, wherein a decrease in such flow of gas is indicative of a blockage/occlusion/residue build-up* in the gaseous flow path in the apparatus, which system and apparatus includes the further features of the objected-to subject matter found in claims 9-10, 14, 23-24, 28, 35-36, 40, 45-46 and 50.

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Additional novelty of a non-obvious nature is found for a similar instant invention [in regards to claim 1] having a ***flowmeter be interposed/utilized in the gaseous flow path to determine a flow rate of gas*** flowing from the gas supply [instead of determining a volume of gas flow], which system and apparatus includes the further features of the objected-to subject matter found in claims 9-10, 14, 23-24, 28, 35-36, 40, 45-46 and 50.

### ***Conclusion***

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The references cited on the accompanying form PTO-892 are listed to show examples of state of the art apparatus and methods for determining, monitoring and/or controlling apparatus operating conditions during the manufacture & processing of semiconductor wafers, chips and/or integrated circuitry structures by utilizing a fluid flow detector, fluid flowmeter, fluid flow-comparator and/or fluid pressure measurement/vacuum pressure measurement device to determine the status quo of "process step operations", or any change in quality control or purity of supplied processing materials, or any possible occurrence of faulty part production, or any possible occurrence of damage in/to the manufacturing &

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processing apparatus [whether or not such manufacturing and processing steps/operations include chemical vapor deposition (CVD); plasma etching, beam sputtering, vacuum and thermal treatments, reaction/fabrication chamber cleaning and wall or flow-line purging; and whether or not the system serves the purpose of detecting occurrence of any fluid flow blockage(s), fluid flow-line occlusion(s), chamber wall deposits or residue build-up(s)], which share one or more features in common with the instant invention.

8. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to J. David Wiggins whose telephone number is (703) 305-4884. The Examiner can normally be reached on Monday to Friday from 9AM to 7PM. If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's Supervisor, Hezron E. Williams, can be reached on (703) 305-4705. The fax phone number for this Group is (703) 308-7382.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group

Receptionist whose telephone number is (703) 305-4900.

WIGGINS\jdw

January 15, 2003

*JDW*

HELEN KWOK  
HELEN KWOK  
PRIMARY EXAMINER

*Helen Kwok*